The piriformis muscle and its relation to the long legged sciatic syndrome

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Clinical investigations and analysis of patient records, revealed that patients with a presenting complaint of sciatica, affecting the apparent long leg side, did not respond as well to chiropractic therapy as those with the sciatica affecting the short leg. Discussions with other chiropractic clinicians[1], and analysis of their patient records revealed similar findings. Careful examination of patients who did not respond to therapeutic trial revealed the presence of a piriformis muscle syndrome on the side of the long leg.

In this paper is an attempt to review the literature as it relates to the piriformis muscle syndrome, and present an effective chiropractic technique for its correction.

Yeoman[2], in 1928 referred to the piriformis muscle as a cause of sciatic pain, and to sacroiliac joint lesions as a cause of inflammatory reaction of the piriformis muscle and fascia.

The piriformis muscle syndrome was first described by Freiberg and Vinke in 1934[3,4], and has been confirmed in the literature by Robinson[5], Edwards[6], Te Poorten[7], Hollinshead[8,9], Mitchell[10], Lewin[11], Retzlaff et all[12], Janse[13], and others.

According to Illi[14], a contraction of the piriformis occurs as a result of a unilateral subluxation of the pelvis (sacroiliac fixation), and this is supported by Lewin[11], that continuing muscle contracture is most often secondary to a primary lesion situated elsewhere.

Anatomy

Freiberg[3] called attention to the fact that the piriformis muscle bridges over the sacro-iliac joint and a part of its origin is intimately bound up with the capsule of the joint and is therefore subject to reflex spasm from intra-articular irritation from the sacro-iliac joint.

Hollingshead[8] states that, "The piriformis is the uppermost of the small muscles of the gluteal region, and the key to the arrangement of nerves and vessels in the buttock. This muscle largely fills the greater sciatic foramen, through which the branches of the sacral plexus and branches of internal iliac vessels leave the pelvis."

The piriformis muscle in more than 10% of cases is perforated by one or both parts of the sciatic nerve,[8,11,13] and other variations occur (Fig. 1). The piriformis arises from the lateral mass of the sacrum from the second to 4th sacral segments. It forms a portion of the posterior wall of the pelvis and is related to a part of the sacral plexus and to the rectum. As it leaves the greater sciatic foramen it usually receives additional fibres from the upper margin of the greater sciatic notch and from the pelvic surface of the sacrotuberous ligament. In the buttock the fibres converge to form a rounded tendon that inserts into the medial side of the upper border of the greater trochanter under cover of the insertion of the gluteus medius. Its action is described as external rotation and abduction and it is thus similar in action to the posterior fibres of the gluteus medius. The piriformis is innervated on its pelvic surface from the first and second sacral nerves.

The sacral plexus branches and the branches of the internal iliac nerve to the gluteal and pudendal areas also leave through the greater sciatic foramen.

It is therefore evident, that in any piriformis muscle injury or contracture, the diameter of the piriformis muscle would increase, thereby filling the greater sciatic foramen, and exerting pressure on all the nerves and vessels that exit through this foramen.

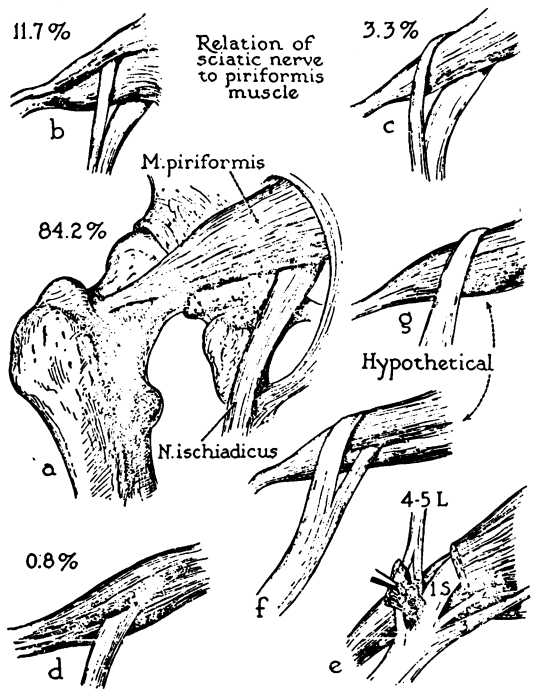

FIG. 1. Varying relations between the sciatic nerve and piriformis muscle. Percentages are those found by Beaton and Anson. (From original of Plate 1, Beaton, L.E., and Anson, B.J.: *Anat. Rec. 70:*1, 1937.)

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Clinical evidence of piriformis spasm and contracture (signs)

1. There is present a limitation of motion in inward rotation of the thigh with the hip joints extended.
2. There is external rotation of the upper leg (known as the positive piriformis sign.[10] See Figure 2.
3. There is tenderness at the sciatic notch and diffuse tenderness over the belly of the muscle which is affected by pressure through the mass of the gluteus maximus muscle.
4. There is a positive manoeuvre in the first few degrees of straight leg raising.[9] Anatomical studies show the sciatic nerve is not stretched until the extreme of hip flexion is reached, and most patients with sciatica reach the limit before this is reached.
5. Clinical investigation of patient records has revealed the sciatica caused by a piriformis muscle spasm is usually on the side of the apparent long leg of the patient.[1]

Symptoms

The piriformis muscle syndrome symptom complex has been called bizarre by Retzlaff et al,[12] and includes low back pain, often persistant and severe, from the sacrum over the gluteal region, the posterior portion of the upper leg to the popliteal space; and if the common peroneal nerve is involved, there may be paraesthesias above and below the knee joint.

Retzlaff[12] has implicated the piriformis syndrome in affecting the pudendal nerve and blood vessels, thereby resulting in problems in the functioning of the genitalia in both sexes. The mechanism, through interference with blood and nerve supply, creates pain on coitus in the female and is a basis for impotency in the male.

Fig. 2: Limitation of motion in inward rotation of the thigh with the hip joints extended and external rotation of the upper leg known as the positive piriformis sign.

Trigger point therapy and adjustive procedure

Trigger point therapy

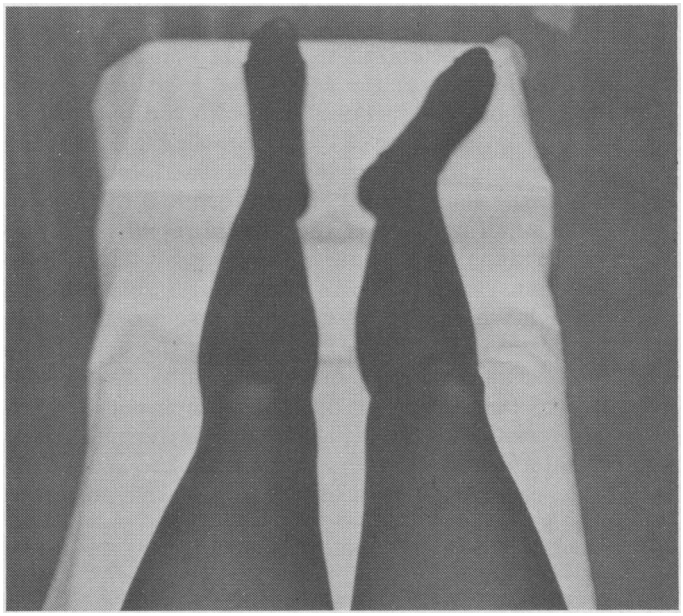
Palpate the point of exquisite tenderness and contracture above the acetabulum over the piriformis. Therapy must be directed to relieve this spasm prior to adjustive procedure (Fig. 3 and 4). The following methods may be used:

1. Use of constant heavy thumb pressure over the area for approximately 30 seconds or until spasm is released.
2. Application of a vibrator applied over the trigger point until the spasm is relieved.
3. Application of ultra sound or a muscle stimulator until the spasm is relieved.
4. The author has found that application of pressure (30 lbs.) applied with the elbow (as illustrated in Figure 5 and 6), after Edwards[6] and Pennell,[15] over the trigger point (with the patient in the lateral recumbent position with the affected side up), is the most effective method of release. Often a definite release may be felt and an audible "click" will be heard at the time of release.

Adjustive procedure

After trigger point therapy has accomplished the desired result, adjustive technique is applied. With the patient in the lateral recumbent position with the affected side up, and on a firm table, the following technique is applied.

The affected leg is genu-flexed on the abdomen, and the affected femur and acetabulum is cupped with the clinician's hand. The operator's knee is placed over the patient's knee (similar to a lumbar roll position), and his



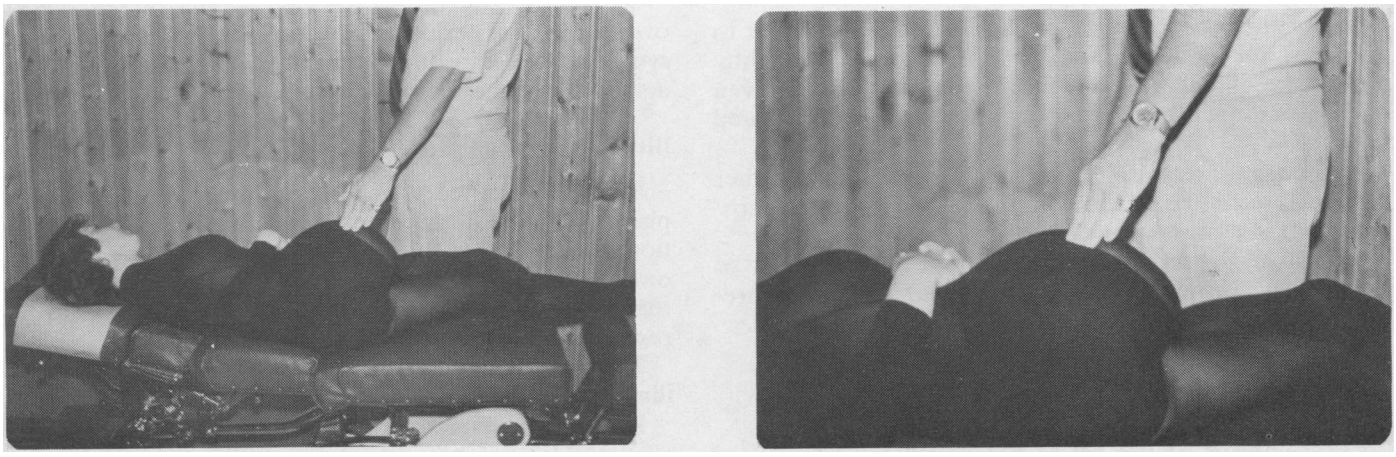


Fig. 3 & 4: Palpating point of exquisite tenderness and contracture above the acetabulum over the piriformis.

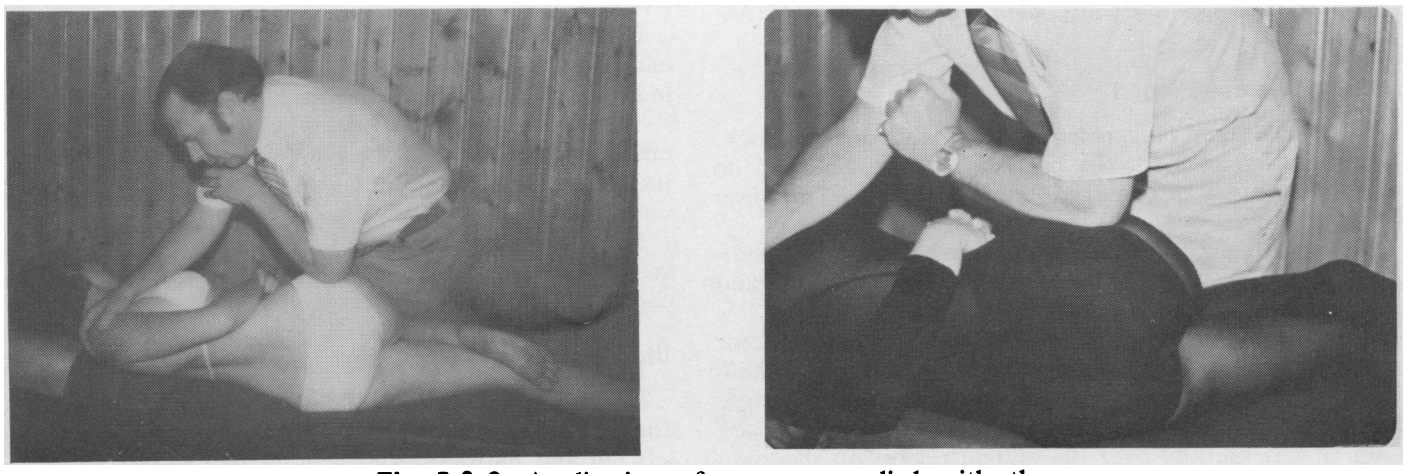


Fig. 5 & 6: Application of pressure applied with the elbow.

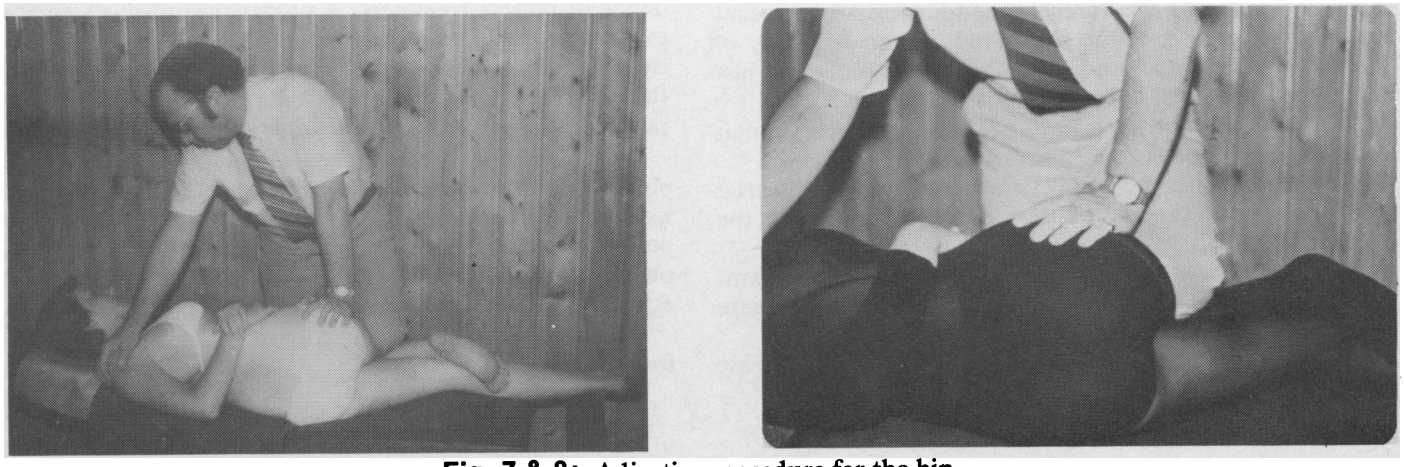


Fig. 7 & 8: Adjustive procedure for the hip.

other hand is placed on the patient's shoulder in order to stabilize the patient. The patient is rocked slightly toward the clinician, and a short dynamic thrust is given to the joint in a downward footward direction (Fig. 7 and 8).

A successful adjustment normally results in a rather loud release similar to that obtained by adjusting a sacroiliac joint in a prone position.

Adjustive procedure should include, after relief of symptoms, correction of the sacroiliac fixation to prevent reoccurrance of the syndrome.

Contraindications for adjustive technique

Osteoarthritis of the hip is not a contraindication to manipulation of the area, however, the practitioner is cautioned against the use of this adjustive technique in patients with conditions causing demineralization of the bone, such as osteoporosis[16] — or any bone consuming lesion such as a primary sarcoma or secondary metastasis.

Illustrative case No. 1

A female aged 50, presented with low back, buttock, and right leg pain for the past six months. She had no previous history of back problems or trauma. The onset was sudden.

Previous care consisted of physician-prescribed medidation and orthopedic prescribed physiotherapy and chiropractic.

The patient was referred by the attending chiropractor after a 4-week unsuccessful trial of therapy, which consisted of ultrasound over the lumbosacral and right sacroiliac joint, manipulation of the right sacroiliac joint and trigger therapy over the gluteal region on the right side.

Examination revealed a decreased patellar reflex on the right leg, positive straight leg raising at 10° elevation, and a long leg on the side of pain (right) of ½". The figure four test was positive with restriction of motion; the piriformis sign was present, tenderness was present on light pressure over the sciatic notch and the belly of the piriformis muscle; and exquisite pain was elicited just superior to the acetabulum over the piriformis.

X-rays of the hip joint were negative, and the lumbar spine revealed moderate degeneration of the L4-5 disc.

Treatment consisted of pressure therapy over the trigger point above the acetabulum, and adjustment to the hip joint.

A major release was felt at the time of the adjustment, and the patient commented that she had an immediate feeling of less pain.

Three subsequent adjustments were made to the hip over a 14 day period, and the patient was discharged symptom-free to return to her attending chiropractor for correction of the sacroiliac lesion.

Illustrative case No. 2

Mrs. S. consulted this clinic on January 9, 1977, complaining of pain in the right hip and leg. During consultation Mrs. S. stated that she had a swine flu innoculation on December 9, 1976, and this pain had progressed since that time. She was treated with medication with no results, and was referred to this office by her physician.

X-ray indicated flexion subluxation of the left sacroiliac joint.

Physical examination revealed a positive piriformis sign, and lack of internal rotation of the right thigh while the hip joints were extended. Deep tendon reflexes were present and equal, and no pathologic reflexes could be demonstrated. The figure four test was positive on the right and straight leg raising on the right side was positive at 5°.

It is the opinion of the author that the innoculation caused an irritation to the piriformis muscle that resulted in its contracture and the resultant piriformis syndrome.

Treatment consisted of deep pressure over the piriformis and adjustment to the hip joint. A total of ten adjustments to the hip joint were given, and five to the sacroiliac.

Mrs. S. was discharged on February 28, 1977, symptom-free. She had had no return of symptoms at the end of March.

Illustrative case No. 3

Ms R. age 26, consulted this clinic on July 6, 1977, complaining of severe pain of sudden onset (affecting the left leg and buttock) after a volleyball game. The pain was concentrated in the left knee.

Physical examination revealed an antalgic gait, positive straight leg raising at 5°, absent Achilles tendon reflex and diminished patellar reflex on the left side. Dermatome patterns were normal and there was no evidence of muscle weakness. A positive piriformis sign was evident on the left side and pain was present on palpation over the piriformis muscle. The apparent long leg was on the left side. X-rays were negative with respect to bone pathology, fracture, dislocation or subluxation.

Treatment consisted of deep elbow pressure over the piriformis muscle and adjustment to the hip joint. A total of ten treatments to the hip joint were given over a period of two weeks. Complete relief of symptoms was obtained. Achilles and patellar reflexes were present and equal.

Ms R. was discharged on August 12, 1977, symptom-free.

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